Nov. 2, 1943. H. B. CHURCHILL. 2,333,361

SNOW REMOVING APPARATUS

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Fig. 1.

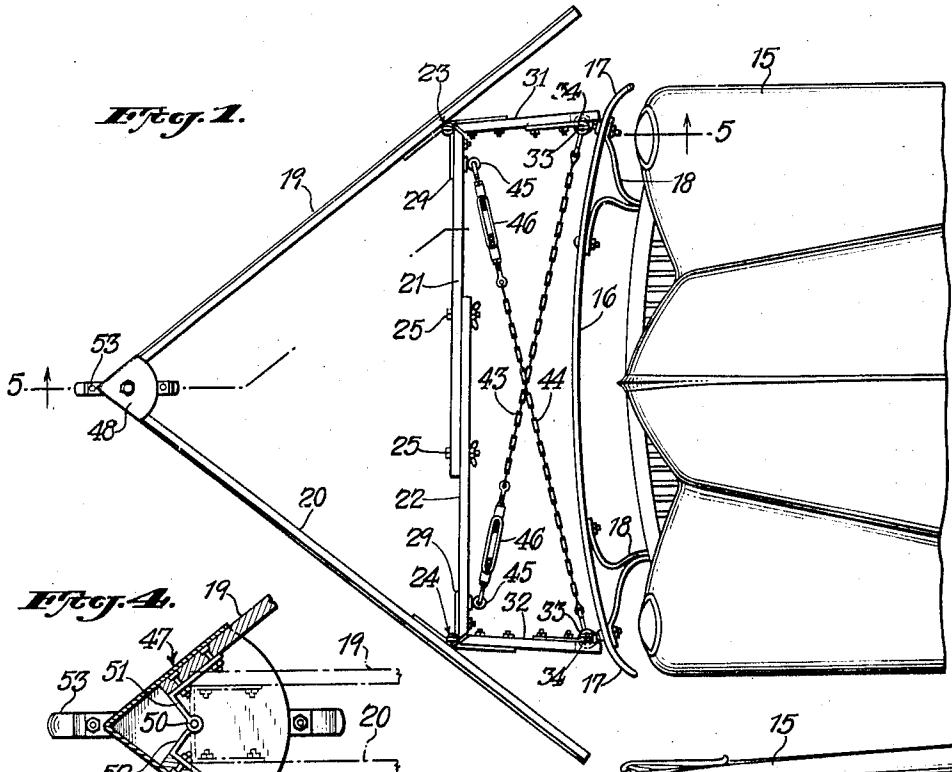
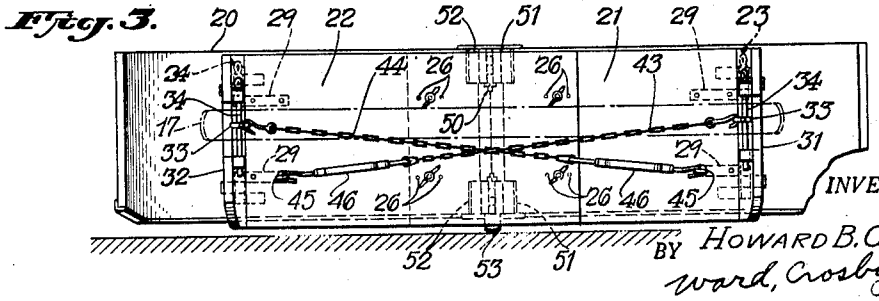


Fig. 4.

Fig. 2.

Fig. 3.



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Fig. 5.

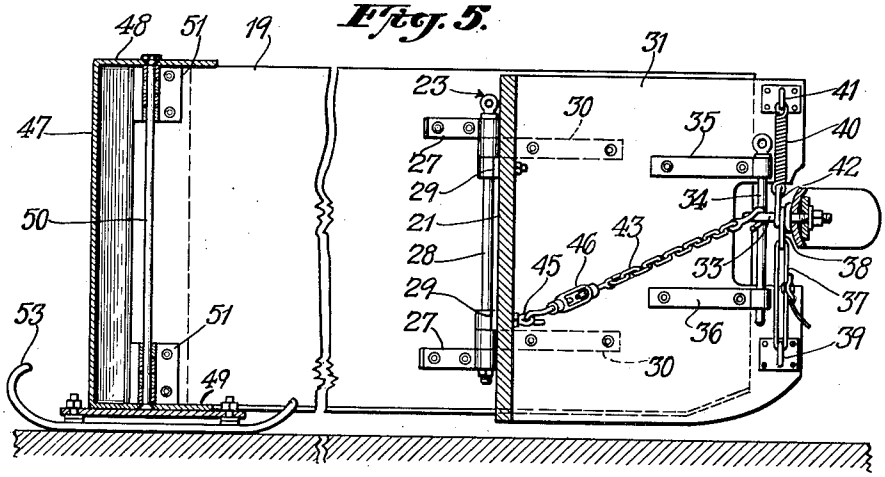


Fig. 6.

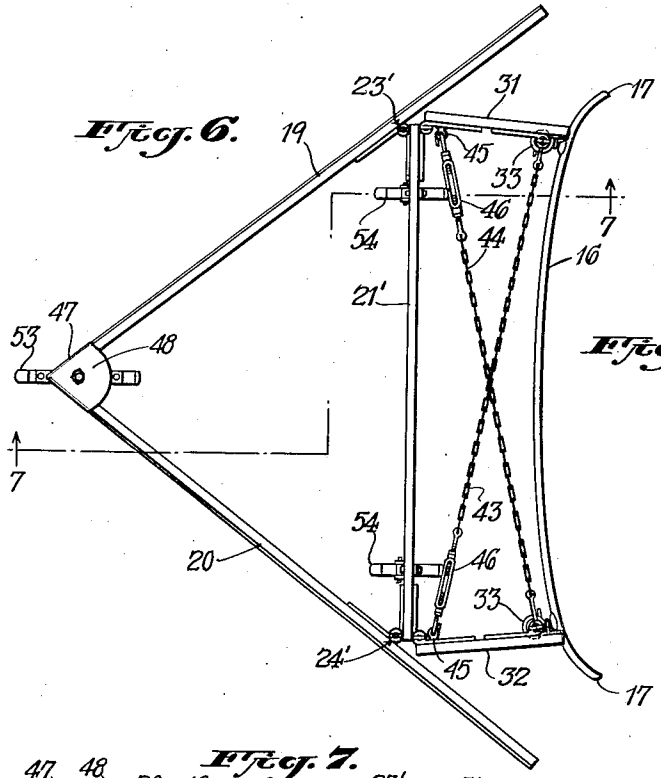


Fig. 8.

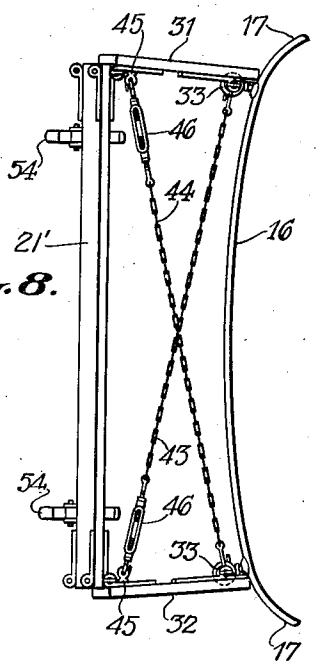
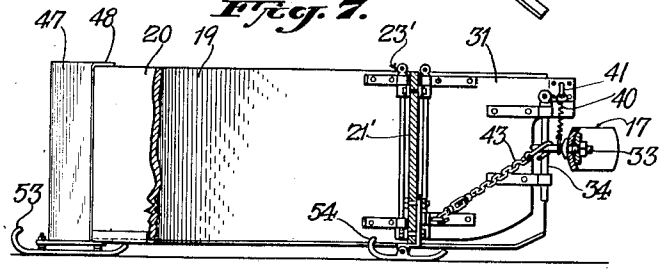


Fig. 7.



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Fig. 9.

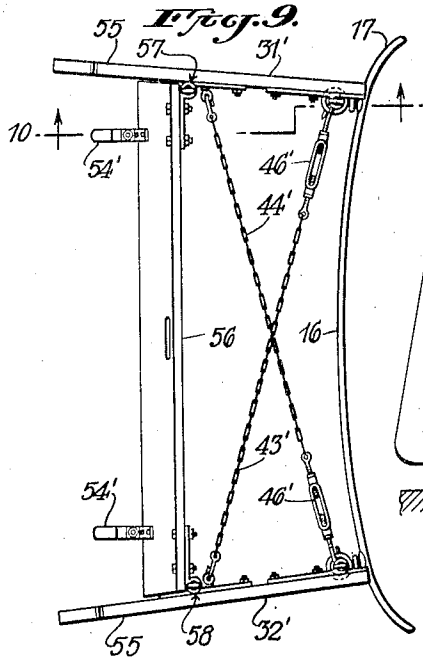


Fig. 10.

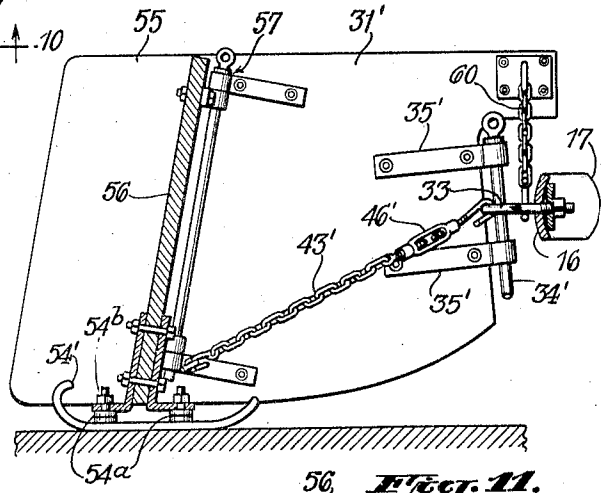


Fig. 11.

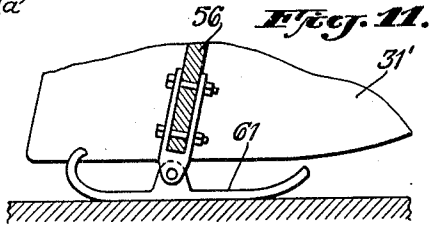


Fig. 12.

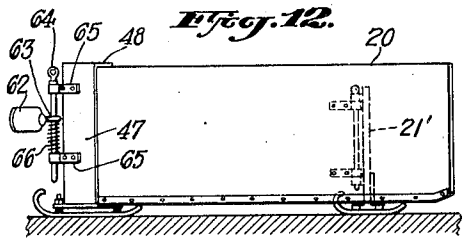


Fig. 13.

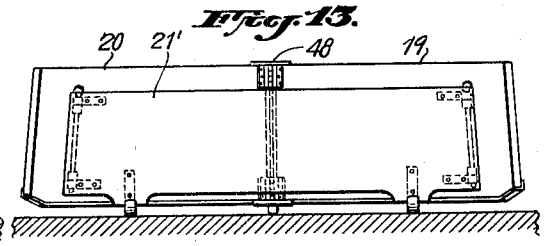


Fig. 14.

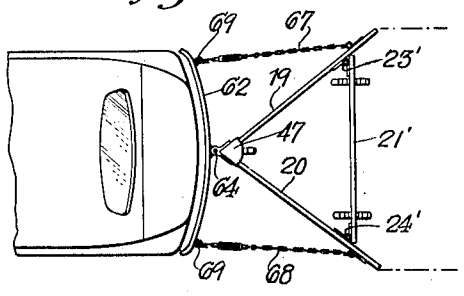
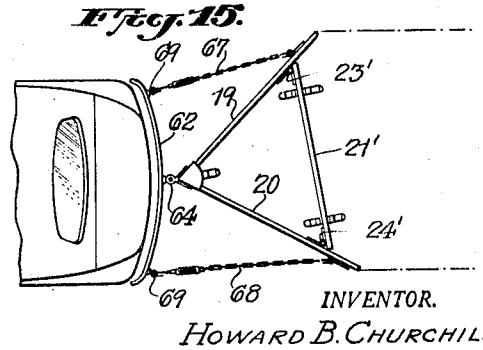


Fig. 15.



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Patented Nov. 2, 1943

2,333,361

UNITED STATES PATENT OFFICE

2,333,361

SNOW REMOVING APPARATUS

Howard B. Churchill, Rye, N. Y.

Application May 6, 1942, Serial No. 441,915

5 Claims. (Cl. 37—44)

This invention relates to snow removing apparatus and more particularly to snow plow and snow pushing constructions, adapted to be detachably applied to bumpers of common types of automobiles.

Alternative forms of this invention are disclosed and claimed in my copending application Ser. No. 441,086, filed April 30, 1942 and entitled "Snow plows."

Heretofore, so far as is known, no fully satisfactory snow removal apparatus has been available of a type particularly adapted, when occasion requires, for quick attachment to an automobile for use by the usual automobile driver, or by small institutions and retail establishments, etc. Such apparatus in order to be conveniently used for these purposes, should preferably be so constructed as to be readily attached to the various common makes of automobiles within a few minutes or less, and without special skill or the use of tools. Furthermore, the arrangement should be collapsible so that it may be stowed in small spaces, preferably with the parts still connected to prevent loss thereof. Also when applied to the ordinary automobile in use, there should be no danger of injury to the car or injury to driveways, sidewalks, etc., through any tendency of the device to dig into the ground or through its failure to pass over minor obstructions. If the area from which the snow is to be removed, is of considerable width or size, the apparatus should also be generally adapted alternatively to act as a snow pushing device or a snow plow.

The present invention provides inexpensive practical constructions fulfilling the above noted requirements. The preferred forms of the invention are particularly well adapted to resist the various transverse and diagonal stresses which are met with by such apparatus when used under a variety of conditions.

Various further and more specific objects, features and advantages of the invention will clearly appear from the detailed description given below taken in connection with the accompanying drawings which form a part of this specification and illustrate by way of example certain preferred forms of the invention. The invention consists in such novel features and combinations as may be shown and described in connection with the apparatus herein disclosed.

In the drawings, Fig. 1 is a plan view showing one form of the invention as applied to an automobile bumper;

Figs. 2 and 3 are side and rear elevational views of the construction of Fig. 1;

Fig. 4 is an enlarged horizontal sectional view through the front portion of the plow of Fig. 1;

Fig. 5 is an enlarged vertical sectional view taken generally along the line 5—5 of Fig. 1;

Fig. 6 is a plan view showing an alternative embodiment of the invention;

Fig. 7 is a vertical sectional view taken generally along the line 7—7 of Fig. 6;

Fig. 8 illustrates the embodiment of Fig. 6 as arranged to form a snow pusher, as distinguished from the snow plow arrangement of Fig. 6;

Fig. 9 is a plan view of another embodiment of the invention;

Fig. 10 is a sectional view taken generally along line 10—10 of Fig. 9;

Fig. 11 is an elevational view of one form of runner means adapted for use with the invention;

Figs. 12 and 13 respectively are side and rear elevational views of a further embodiment of the invention; and

Figs. 14 and 15 are plan views illustrating two methods of connecting the embodiment of Figs. 12 and 13 to the rear bumper of an automobile.

Referring now more specifically to Fig. 1, the front end of a motor vehicle to which the plow is to be attached, is shown at 15 with a front bumper 16 of a well-known type. While in this figure the plow is shown as attached to the front bumper, to be used for plowing when the automobile is driven forwardly, it will be understood that the same and similar constructions may be applied if desired in like manner, to the rear bumper for use when backing the automobile. The bumper 16 as shown is of the conventional type having end portions as at 17, which curve outwardly and rearwardly or toward the vehicle. These portions are secured to the vehicle by means including braces 18 designed to be bolted in the usual way to the rear surfaces of the bumper ends.

The snow plow includes a pair of mold boards as at 19, 20, made for example of plywood and interconnected at their forward ends by hinge means hereinafter described, whereby the boards may be positioned on edge in either an adjustable V formation as shown in Fig. 1, or brought into generally parallel relation as shown by dotted lines in Fig. 4 with spacing therebetween sufficient to accommodate the connecting and bracing means hereinafter described, when collapsed.

As shown in Fig. 2, the mold boards are each of a width to normally extend from adjacent the ground to a height somewhat above the bumper, and the inside surface areas of the rear portions of the boards are, as shown in Fig. 1, adapted to extend outwardly and rearwardly to positions substantially spaced from and opposite the curved bumper ends respectively.

At a point intermediate the ends of the mold boards, a pair of complementary brace members or boards as at 21, 22 may be attached by hinge means as at 23, 24. These brace members at

their inner overlapping ends may be adjustably connected by a plurality of bolts as at 25, adapted to pass through any one of several holes as at 26 (Fig. 3).

As more clearly shown in Fig. 5, each of the hinge means 23, 24 which are of like construction, may comprise a pair of hinge leaves as at 27 secured respectively adjacent the upper and lower edges of the mold board and adapted to cooperate with a readily removable pintle member 28 upon which are also pivoted pairs of hinge leaves as at 29, bolted to one of the transverse brace members 21, 22. Each of the pintle means 28 is also adapted to have pivotal engagement with a third pair of hinge leaves as at 30, which are bolted to a board 31 or 32 adapted to extend forwardly from a connection at an end of the bumper. It will be apparent that the various hinge leaves and attached boards of the hinge means 23, 24 are so constructed and arranged that upon removing the bolts 25, the brace members 21, 22 may be collapsed forwardly to rest during storage against the mold boards 19, 20. Meanwhile the boards 31, 32 may be collapsed compactly against the boards 19, 20.

Means for connecting the rear ends of the board members 31, 32 to the ends of the bumper respectively will now be described. Bolts which secure the bumper braces 18 may be removed and simply replaced by eyebolts as at 33. This may be done when the snow removal apparatus is first acquired and preferably at some time prior to its intended use. Ordinarily no other change need be made to the vehicle or bumper construction in order to prepare the same for quick application of the snow removing apparatus when needed. The protruding rounded eyelet portions of these eyebolts will not materially interfere with the normal uses of the bumper, and furthermore the eyebolts may be used to permanently secure braces 18 to the rear surface of the bumper. Of course, in cases where the apparatus is to be applied to bumpers of a type which does not have brace bolts adjacent the ends, the eyebolts 33 may be installed after suitably drilling the bumper. A readily removable pintle as at 34 is mounted along the rear vertical edge of each of the board members 31 and 32 and held in place as by hinge elements 35, 36, which in turn are bolted or riveted in place with a considerable vertical spacing therebetween. The pintle 34 is adapted to be passed down through an aperture in the hinge element 35, thence through the eyelet of eyebolt 33, and into the aperture of hinge element 36.

In order to normally hold the rear portions of the apparatus in slightly spaced relation to the ground, straps as at 37 or other adjustable means capable of withstanding considerable tension, are applied, with one end secured as by an eyelet 38 to the shank of an eyebolt 33, and having the other end attached to the board 31 or 32 as by an eyelet member 39 or other suitable means. This strap will therefore serve to normally carry the weight of the rear portions of the apparatus, yet in case the lower edges thereof should encounter an obstruction or raised area on the ground, the parts will still be free to rise by the sliding of the pin 34 upwardly with respect to the eyebolt 33. If desired, any such rising of the rear portions of the apparatus may be resisted by the tension of helical springs as at 40 secured at their upper ends by eyelet members 41 on the top inside face of boards 31, 32, the lower ends of springs 40 being preferably attached through one or more links as at 42 to the shanks of eyebolts 33. Thus when the rear portions of the apparatus tend to rise, either by engagement with some obstruction on the ground or by reason of any transverse tilting forces applied to one of the mold boards, for example, the tension of one or both springs 40 will be increased, thereby resisting further rising of one side of the apparatus with respect to the other, and tending to keep both sides down to the limit permitted by straps 37. If it is desired to permit the rear portions of the apparatus to slide on the ground, which may be satisfactory where the areas to be plowed are smooth, then the straps 37 may of course be omitted. Also if no troublesome tendency is encountered for the rear portions of the apparatus to rise out of position, the spring members 40 may be omitted.

With the arrangement as thus far described, it will be apparent that the boards 31, 32 would be more or less free to swing about the eyebolts 33, from side to side and with pivotal action at the hinge means 23, 24. Heavy stresses tending to cause such swinging would occur whenever the apparatus is used to plow a curved path or when used to widen an area already partially cleared. In order to effectively resist such stresses, a pair of tensioned stays as at 43, 44 may be provided, comprising small wire cables or chains as shown. The stay 43 for example may be connected to eyebolts 33 at the righthand side of the bumper, from which point it may run diagonally forwardly and downwardly to an eyebolt 45 secured as shown to brace member 22. Similarly, stay 44 may be connected along the opposite diagonal. Turnbuckles as at 46 may be interposed for tightening the stays, whereupon it will be apparent that a quadrangular structure will be provided, with the bumper comprising one of the sides, and the transverse brace members and board members 31, 32 comprising the other sides, and although all corners of this structure are hingedly connected, yet the structure is retained with a high degree of rigidity by the diagonal stays, and is thus able to effectively resist stresses in all horizontal directions as well as considerable stresses in vertical directions.

It will be apparent that with the above described bumper connecting means the apparatus may be quickly detached from the bumper simply by pulling out the pins 34, whereupon the eyelets 38 and 42 for attaching the strap and spring may be quickly unhooked from the eyebolt 33. The stays 43, 44 will now be loose so that the boards 31, 32 may be moved to collapsed positions as above described, and the stays may be unhooked if desired. Upon removal of bolts 25, the mold boards 19, 20 may be brought into generally parallel spaced relationship as shown by the dotted lines in Fig. 4, with the space therebetween accommodating the braces, stays and connecting means, etc., during storage. The entire collapsed arrangement may if desired be stored in a vertical position with the rear vertical edges of the mold boards 19, 20, forming stable floor-engaging supports.

In order to attach the construction of Fig. 1 to a vehicle bumper, the mold boards 19 and 21 are first arranged in front or to the rear of the car in the V formation shown, and with the hinge means 23, 24 in place. The rear ends of the boards 31, 32 may then be moved from side to side through considerable angles as may be necessary, depending upon the width of various types of bumpers and the spacing between the eye-

bolts 33 which have been applied thereto. Thus the pintles or hinge pins 34 may be readily and quickly inserted despite considerable variations in such spacing on different cars and without necessitating any careful placing or holding of the mold boards 19, 20 in position. After the hinge pintles 34 are in place, the stays 43, 44 may be hooked on and tightened, whereupon the plow is ready for use.

The construction at the forward end of the mold boards may be the same as that described and claimed in my above mentioned copending application. Briefly, this may comprise a metal nose piece of V-shaped cross section 47 having generally horizontal top and bottom sector-shaped web plates as at 48, 49 welded thereto, these web plates being apertured to carry pintle member 50 for hinge elements as at 51, 52 secured to the forward top and lower corners of the mold boards. These hinge elements as shown are provided with angular leaves with offset attaching portions so as to provide for the spaced parallel relationship of the mold boards when collapsed. As will be apparent in Fig. 4, the hinge elements and pintle 50 are so constructed and placed with respect to the adjacent parts that the nose piece 47 is retained by the outer faces of the forward ends of the mold boards against any substantial pivotal movement when the boards are in the V formation ready for use. Yet the relationship is such that the mold boards may be collapsed into spaced parallel relationship while the nose piece is still pivotally connected. A runner as at 53 is preferably provided to support the forward portion of the plow in slightly spaced relationship to the ground.

In some cases it may be desired to use the above described quadrangular structure alone as a snow pusher, as for example where a considerable area of a yard has to be cleared by pushing snow for some distance instead of merely plowing a path. In such cases the mold boards 19, 20 may be quickly disconnected simply by removing the hinge pintles at hinge means 23, 24 and then restoring the pintles to retain the parts of the quadrangular structure. The structure may then be pushed by the vehicle against large masses of snow in a manner whereby the brace boards 21, 22 may act to push such snow considerable distances.

Where the arrangement is to function as a snow pusher to any considerable extent, it may be preferable to modify the brace board means as shown in Figs. 6–8. Here instead of a pair of connected transverse brace members, a single board as at 21′ may be used and of a width to normally extend from near the ground to a height above the level of the bumper. As shown, the board 21′ is also preferably, but not necessarily, provided with a pair of runners as at 54, for retaining the structure in slightly spaced relationship to the ground. The board 21′ may be secured to the mold boards 19, 20 respectively as by detachable hinge means as at 23′, 24′. To collapse this structure it will be merely necessary to remove the pintles at these hinge means whereupon it will be apparent that the quadrilateral arrangement may be readily disconnected from the bumper and collapsed separately from the mold boards. Or if it is merely desired to convert the plow of Fig. 6 into a pusher, the mold boards 19, 20 alone may be removed, thereby leaving a pusher construction as shown in Fig. 8. In some cases it may be desirable to provide with the construction of Figs. 1–5, an extra board such as at 21′ of Figs. 6–8, with hinge means of dimensions permitting use of such a board interchangeably with brace members 21, 22.

Except as otherwise explained above, the construction of Figs. 6–8 may be the same as or similar to that of Figs. 1–5.

While the members 31, 32 and corresponding members of other examples of the invention herein disclosed are referred to as "boards," it will be understood that this term is intended to comprehend such members even though made of sheet metal or other suitable material, some of which may of course be cut away as desired for lightness at points where the material would serve no useful function. The term "board" is also intended to be used in a generic sense as applied to the brace members 21, 22 and 21′, it being apparent further that these parts may be made integral, or the overlapping adjustable form may be preferred for ease in collapsing or for securing a wider variety of adjustments for different automobiles.

In Figs. 9 and 10 a construction similar to that of Fig. 8 is shown, but modified for use exclusively as a pusher. In this construction the side boards as at 31′, 32′ may be generally similar to the boards 31, 32 of Fig. 1 except that they preferably extend forward as at 55 to points considerably in advance of a transverse brace and pusher board 56. The extensions 55 will thus serve to retain larger masses of snow against sliding away from the board 56. The board 56 may preferably be inclined upwardly and rearwardly somewhat in this construction to prevent any tendency for the structure to rise above the snow. The degree of incline may be adjusted or determined by the position or adjustment of the bumper connecting means hereinafter described. This board may be attached to the side boards 31′, 32′, by detachable hinge means as at 57, 58, the construction of which will be readily apparent from Figs. 9 and 10. The lower edge of board 56 may be normally supported in slightly spaced relation to the ground as by runners 54′. These runners, and in fact all of the runners 53, 54 and 54′ if desired, may be secured at adjustable distances from the lower edges of the boards, as for example by variable numbers of spacing washers 54a carried on bolts or threaded pins 54b (Fig. 10).

The means for attaching the constructions of Figs. 6–8 and Figs. 9 and 10 to the bumper, may as shown be substantially the same as in Fig. 1, except that if runners as at 54, 54′ are used, it will be unnecessary to provide straps as at 37 of Fig. 1 in order to hold rear portions of the structures of Figs. 6–10 in spaced relation to the ground. Also as shown more clearly in Fig. 10, the spring 40 such as used in the construction of Figs. 1–5, may be dispensed with, and replaced by a chain 60 to positively retain the rear portion of the device against any tendency to rise. To the same end, the hinge means for connecting the rear ends of boards 31′, 32′ to the bumper are preferably so applied that the hinge pintles 34′ are normally tilted forwardly at a slight angle, so that the forward thrust on the bumper eyebolt 33 will tend to force the structure downwardly rather than upwardly (see Fig. 10). Other features of the construction of Figs. 9 and 10 will be apparent from comparison of the parts with those of Figs. 1–5, corresponding parts being identified by the same reference numerals or the same numerals accompanied by prime marks.

The various runner constructions as shown in

Figs. 1–10 are rigidly attached. In some cases smoother sliding action may be accomplished by using a pivotally attached runner **61**, the construction of which will be readily apparent in Fig. 11.

As explained above, the construction of Fig. 6 may be partially used to provide a pusher as of Fig. 8. On the other hand, by removing the boards **31**, **32** and the accompanying stays **43**, **44**, the same or similar constructions may be used as a snow plow attached to the rear bumper of the automobile by means as shown in Figs. 12–15. Here the rear bumper **62** is provided centrally with an eyebolt **63** adapted to be engaged by a removable pintle **64**, which in turn may be retained as by hinge elements **65** on the nose piece **47**. The main purpose of this connecting means is to prevent the nose of the plow from being deflected from side to side. The lower portion of the pintle **64** may be embraced by a coiled compression spring **66** bearing at its upper end, against the eyelet of the eyebolt and at its lower end against the lower hinge element **65**. This will prevent any tendency for the nose piece to rise excessively as the plow is being dragged back of the automobile. As shown in Fig. 14, if a path is to be plowed directly to the rear of the automobile, then the rear portions of the mold boards **19**, **20** respectively may be connected by stays or chains **67**, **68** adjusted to equal lengths as by turnbuckles and connected to eyebolts as at **69** at the ends of the bumper. These stays will normally serve to apply the advancing force to the plow, thus leaving the nose piece connection to the bumper free for some articulation, pivotally and vertically without jamming. These stays will also prevent the rear portions of the plow from swinging from side to side. With this method of connection to the rear bumper, the plow may be dragged at relatively high speed provided the snow is not too deep for the car to travel in advance of the plow. This arrangement has the further advantage as shown in Fig. 15, that one of the stays **67**, **68** may be shortened while the other is correspondingly lengthened to thereby retain the plow somewhat to one side or the other of the path of the car, as in cases where it is desired to widen one side of the path previously plowed. In some cases it may be found desirable to plow a path with the arrangement as of Fig. 6 in advance of the automobile, and then if it is desired to widen this path rapidly, or if it is desired to plow out gutters at each side of the path, the structure of Fig. 6 may then be rearranged and connected as in Fig. 15. The latter arrangement will afford a convenient means for extending the plowed area onto inclined or gutter portions of the road where it might be unsafe to drive the wheels of the automobile because of muddy conditions or slipping.

While the invention has been described in detail with respect to particular preferred examples, it will be understood by those skilled in the art after understanding the invention that various changes and modifications may be made without departing from the spirit and scope of the invention, and it is intended therefore in the appended claims to cover all such changes and modifications.

What is claimed as new and desired to be secured by Letters Patent is:

1. Snow removal apparatus adapted to be detachably connected to automobile bumpers, comprising a plurality of boards adapted to be arranged on edge to form with the bumper, a generally quadrangular structure, hinge connections at the corners of such structure, and a pair of tension stays respectively for extending substantially along the diagonals of such structure.

2. Snow removal apparatus adapted to be detachably connected to automobile bumpers, comprising a plurality of boards adapted to be arranged on edge to form a generally quadrangular structure with the bumper comprising one side, hinge connections at the corners of such structure, a pair of tension stays respectively for extending substantially along the diagonals of such structure, and a pair of mold boards connected at their forward ends in V formation, and having their rear portions respectively connected to the forward corners of said structure.

3. Snow removal apparatus adapted to be detachably connected to automobile bumpers, comprising a pair of boards adapted to be arranged on edge to extend in advance of the vehicle respectively from the end portions of the bumper, means for connecting said boards to said bumper portions, another board adapted to be arranged on edge to extend transversely between said first named boards, said latter board being adapted to push forwardly masses of snow which are retained between the forward ends of said first named boards, hinge means connecting the ends of said latter board to the inner faces of the first named boards intermediate the ends of the latter, whereby the ends of the first named boards at the bumper may swing inwardly or outwardly of the bumper ends for connection to bumpers of different designs and means for normally maintaining said pair of boards in relative fixed relationship.

4. Snow removal apparatus adapted to be detachably connected to motor vehicle bumpers of types having supporting braces normally bolted to the rear surfaces of the bumper end portions, comprising in combination: eyelet means adapted respectively to be bolted on the front surfaces of the bumper ends by means which also bolt said braces to the rear surfaces, a pair of boards adapted to be arranged on edge to extend in advance of said eyelet means, snow pushing means connected to the forward portions of said boards, pin means secured in generally vertical position adjacent the rear edge of each of said boards and embraced respectively by asid eyelet means, and means for normally maintaining said pair of boards in relative fixed relationship.

5. Snow removal apparatus adapted to be detachably connected to motor vehicle bumpers of types having supporting braces normally bolted to the rear surfaces of the bumper end portions, comprising in combination: a pair of boards adapted to be arranged on edge to extend in advance respectively of the end portions of a bumper, connecting means at the rear edge of each board respectively, common means for securing said braces respectively to the rear surface of the bumper ends while detachably securing said connecting means to the front surface of the bumper ends, means for engaging and displacing snow secured in respect to the forward portions of said boards, and means for normally maintaining said portions against relative displacement.

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